# Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

## Appendix 2 - Biotope Sensitivity Ranges

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## Glossary of Acronyms

| | |
|---|---|
| AoO | Advice on Operations |
| DEP | Dudgeon Extension Project |
| MarLIN | Marine Life Information Network |
| MARESA | Marine Evidence Based Sensitivity Assessment |
| MCZ | Marine Conservation Zone |
| SEP | Sheringham Shoal Extension Project |

## Glossary of Terms

| | |
|---|---|
| The Dudgeon Offshore Wind Farm Extension Project (DEP) | The Dudgeon Offshore Wind Farm Extension site as well as all onshore and offshore infrastructure. |
| Resistance | The likelihood of damage (termed intolerance or resistance) due to a pressure |
| Resilience | The rate of (or time taken for) recovery (termed recoverability, or resilience) once the pressure has abated or been removed. |
| The Sheringham Shoal Offshore Wind Farm Extension Project (SEP) | The Sheringham Shoal Offshore Wind Farm Extension site as well as all onshore and offshore infrastructure. |

# 1 MarESA Biotope Sensitivity

## 1.1 Introduction

1. The impact assessment presented in the Dudgeon Extension Project (DEP) and Sheringham Extension Project (SEP) **Marine Conservation Zone Assessment (MCZA)** uses Natural England's Advice on Operations (AoO) for the Cromer Shoal Chalk Beds (CSCB) MCZ in relation to the sensitivity of the biotopes associated with the protected features of the MCZ. The definition of sensitivity used by Natural England's Conservation Advice Package for the CSCB MCZ are based on Marine Life Information Network (MarLIN's) Marine Evidence based Sensitivity Assessment (MarESA) (Tyler-Walters et al., 2018). MarESA determines sensitivity based on resistance (tolerance) and resilience (recoverability) which are defined as:
   - Resistance: the likelihood of damage (termed intolerance or resistance) due to a pressure;
   - Resilience: the rate of (or time taken for) recovery (termed recoverability, or resilience) once the pressure has abated or been removed.
2. Descriptions of Resistance and Resilience are presented in **Table 1-1** below.

*Table 1-1 Resistance and Resilience Scale Definitions*

| Level | Description |
|---|---|
| **Resistance (Tolerance)** | |
| None | Key functional, structural, characterizing species severely decline and/or physicochemical parameters are also affected e.g. removal of habitats causing a change in habitats type. A severe decline/reduction relates to the loss of 75% of the extent, density or abundance of the selected species or habitat component e.g. loss of 75% substratum (where this can be sensibly applied). |
| Low | Significant mortality of key and characterizing species with some effects on the physicochemical character of habitat. A significant decline/reduction relates to the loss of 25-75% of the extent, density, or abundance of the selected species or habitat component e.g. loss of 25-75% of the substratum. |
| Medium | Some mortality of species (can be significant where these are not keystone structural/functional and characterizing species) without change to habitats relates to the loss <25% of the species or habitat component. |
| High | No significant effects on the physicochemical character of habitat and no effect on population viability of key/characterizing species but may affect feeding, respiration and reproduction rates. |

| Level | Description |
|---|---|
| **Resilience (Recovery)** | |
| Very Low | Negligible or prolonged recovery possible; at least 25 years to recover structure and function. |
| Low | Full recovery within 10-25 years. |
| Medium | Full recovery within 2-10 years. |
| High | Full recovery within 2 years. |

3. The MarESA assessment of sensitivity is guided by the presence of key structural or functional species/assemblages and/or those that characterize the biotope groups. Physical and chemical characteristics are also considered where they structure the community. MarESA uses a matrix approach to determine sensitivity based on both recovery and resilience. The sensitivity matrix used in the impact assessment in the **MCZA** based on MarESA, is presented in **Table 1-2**.

*Table 1-2 Sensitivity Matrix*

| | | Resistance | | | |
|---|---|---|---|---|---|
| | | **None** | **Low** | **Medium** | **High** |
| **Resilience** | **Very Low** | High | High | Medium | Low |
| | **Low** | High | High | Medium | Low |
| | **Medium** | Medium | Medium | Medium | Low |
| | **High** | Medium | Low | Low | Negligible |

## 1.2 Sensitivity Assessment

4. **Table 1-3** sets out the MarESA sensitivity assessment of biotopes associated with the protected features of the CSCB MCZ obtained from Natural England's AoO, which were used in the impact assessment in the **MCZA**. Sensitivity is not available for the North Norfolk Coast protected feature, therefore sensitivity of other habitats has been used as a proxy in the **MCZA**.

*Table 1-3 sensitivity ranges for the potential biotopes associated with the CSCB MCZ protected features, in relation to the pressures screened into the Stage 1 assessment. NI = no interaction between receptor and the pressure therefore sensitivity range is not provided; NR = Not relevant, as determined by Natural England's AoO; NA = Not Assessed by Natural England (Natural England, 2021).*

| Potential pressure (scoping) | Pressure (AoO) | High energy circalittoral rock (A4.1) | Moderate energy circalittoral rock (A4.2) | High energy infralittoral rock (A3.1) | Moderate energy infralittoral rock (A3.2) | Subtidal chalk | Subtidal coarse sediment (A5.1) | Subtidal mixed sediments (A5.4) | Subtidal sand (A5.2) | Peat and clay exposures |
|---|---|---|---|---|---|---|---|---|---|---|
| Temporary habitat loss/ physical disturbance | Abrasion/disturbance of the substrate on the surface of the seabed | NI | NI | NI | NI | NI | Not sensitive - Low | Medium | Not sensitive - Medium | NI |
| | Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion | NI | NI | NR | NR | NI | Not sensitive - Medium | Medium | Low - Medium | NI |
| | Habitat structure changes - removal of substratum (extraction) | NI | NI | NR | NR | NI | Medium | Medium | Medium | High |
| Permanent habitat loss | Physical change (to another seabed/sediment type) | NI | NI | NI | NI | NI | High | Not sensitive - High | High | NI |
| Increased suspended sediment concentrations | Changes in suspended solids (water clarity) | Not sensitive - Medium | Not sensitive - Low | Medium | Not sensitive | Low | Not sensitive | Not sensitive | Not sensitive - Low | Not sensitive |
| | Smothering and siltation rate changes (Light) | Not sensitive - Low | Not sensitive - Medium | Not sensitive | Not sensitive | Not sensitive | Not sensitive - Low | Not sensitive - Medium | Not sensitive - Low | Medium |
| Re-mobilisation of contaminated sediments | Introduction of other substances (solid, liquid or gas) | NA | NA | NA | NA | NA | NA | NA | NA | NA |

| Potential pressure (scoping) | Pressure (AoO) | High energy circalittoral rock (A4.1) | Moderate energy circalittoral rock (A4.2) | High energy infralittoral rock (A3.1) | Moderate energy infralittoral rock (A3.2) | Subtidal chalk | Subtidal coarse sediment (A5.1) | Subtidal mixed sediments (A5.4) | Subtidal sand (A5.2) | Peat and clay exposures |
|---|---|---|---|---|---|---|---|---|---|---|
| | Transition elements & organo-metal (e.g. TBT) contamination | | | | | | | | | |
| Effects on bedload sediment transport | Water flow (tidal current) changes, including sediment transport considerations | Not sensitive | Not sensitive - medium | Not sensitive | Not sensitive | Not sensitive | Not sensitive | Not sensitive | Not sensitive | Not sensitive |
| Invasive species | Introduction or spread of invasive non-indigenous species (INIS) | NI | NI | NI | NI | NR | Not sensitive - High | Insufficient evidence- Medium | Not sensitive - High | NI |

### 1.2.1 References

Natural England (2021) Cromer Shoal Chalk Beds MCZ Advice on Operations. Available at:
[redacted]

Tyler-Walters, H., Tillin, H.M., d'Avack, E.A.S., Perry, F. & Stamp, T. (2018). Marine Evidence-based Sensitivity Assessment (MarESA) – A Guide. Marine Life Information Network (MarLIN). Marine Biological Association of the United Kingdom, Plymouth, 91 pp